

Package ‘plotmm’

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Type Package

Title Tidy Tools for Visualizing Mixture Models

Version 0.1.2

BugReports <https://github.com/pdwaggoner/plotmm/issues>

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Description The main function, `plot_mm()`, is used for (gg)plotting output from mixture models, including both densities and overlaying mixture weight component curves from the fit models in line with the tidy principles. The package includes several additional functions for added plot customization. Supported model objects include: 'mixtools', 'EMCluster', and 'flexmix', with more from each in active dev. Supported mixture model specifications include mixtures of univariate Gaussians, multivariate Gaussians, Gammas, logistic regressions, linear regressions, and Poisson regressions.

Imports methods, wesanderson, amerika, ggplot2, mixtools, EMCluster, flexmix

Suggests testthat, graphics, dplyr, patchwork, survival, magrittr, knitr, rmarkdown

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plot_cut_point	<i>Tidy Visualization of a Cut Point from a Mixture Model</i>
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Description

Returns a plot of the data density (histogram) with an overlaid cut point generated by the fit mixture model

Usage

```
plot_cut_point(m, plot = TRUE, color = c("grayscale", "amerika", "wesanderson"))
```

Arguments

m	An object of class <code>mixEM</code> corresponding with the fit mixture model
plot	Logical for generating the plot. If <code>FALSE</code> , only the cut point value from the GMM is returned. If <code>TRUE</code> , histogram with the overlaid cut point is returned. Default is set to <code>TRUE</code> .
color	A vector of color options including "amerika" (from <code>amerika</code> package), "wesanderson" (from <code>wesanderson</code> package), and "grayscale", which is the default option.

Details

Mixture models can be used to derive cut points separating clusters via soft assignment (See Benaglia et al. 2009 for more). `plot_cut_point()` plots data density with an overlaid cut point (the mean of the calculated μ) from `mixEM` objects via `mixtools`. Note, this function is in its infancy, and at present only works in the limited context of 2-component Gaussian mixture models with equal priors and equal variances. Development for more complex cases is in process.

References

Benaglia, T., Chauveau, D., Hunter, D. and Young, D. 2009. `mixtools`: An R package for analyzing finite mixture models. *Journal of Statistical Software*, 32(6), pp.1-29.

Ram, K., and Wickham, H. 2015. `wesanderson`: a Wes Anderson palette generator. R package version 0.3.

Examples

```
## Not run:
if(require(mixtools)){
  mixmdl <- mixtools::normalmixEM(faithful$waiting, k = 2)
}
plot_cut_point(mixmdl, plot = TRUE, color = "amerika") # returns plot, amerika
plot_cut_point(mixmdl, plot = TRUE, color = "wesanderson") # returns plot, wesanderson
plot_cut_point(mixmdl, plot = FALSE) # returns only the cut point value from the GMM

## End(Not run)
```

plot_gmm

Plots Mixture Components from Gaussian Mixture Models

Description

Generates a plot of data densities with overlaid mixture components from a Gaussian mixture model (GMM)

Usage

```
plot_gmm(m, k = NULL)
```

Arguments

m	An object of class <code>mixEM</code> corresponding with the fit GMM
k	The number of components specified in the GMM, m

Details

Original function from the `plotGMM` package. Retained here for bridging between the packages. We recommend using instead the updated `plot_mm` function.

Note: `plot_gmm` requires a `mixtools` object to be supplied. Users must enter the same component value, `k`, in the `plot_gmm` function, as that which was specified in the original GMM specification (also `k` in `mixtools`).

References

Benaglia, T., Chauveau, D., Hunter, D. and Young, D., 2009. `mixtools`: An R package for analyzing finite mixture models. *Journal of Statistical Software*, 32(6), pp.1-29.

Wickham, H., 2016. `ggplot2`: elegant graphics for data analysis. Springer.

Examples

```
## Not run:
if(require(mixtools)){
  mixmdl <- mixtools::normalmixEM(faithful$waiting, k = 2)
}
plot_gmm(mixmdl, 2)

## End(Not run)
```

plot_mix_comps

Helper Function for Overlaying Mixture Components

Description

Allows for plotting mixture components conditioned on a superimposed function meant for passage to ggplot's stat_function()

Usage

```
plot_mix_comps(x, mu = NULL, sigma = NULL, lam = 1, beta0 = NULL,
  beta1=NULL, alpha=NULL, beta=NULL,
  normal=FALSE, logisreg=FALSE,
  gamma=FALSE, poisson=FALSE)
```

Arguments

x	Input data
mu	Component mean
sigma	Component variance
lam	Component mixture weight
beta0	Coefficient values
beta1	Coefficient values
alpha	Initial shape parameters
beta	Initial parameter values
normal	Logical for normal distribution
logisreg	Logical for logistic regression mixtures
gamma	Logical for gamma distribution
poisson	Logical for poisson regression mixtures

Details

Allows for component curves to be superimposed over a mixture model plot

Examples

```
## Not run:
if(require(mixtools)){
  mixmdl <- mixtools::normalmixEM(faithful$waiting, k = 2)
}
x <- mixmdl$x
x <- data.frame(x)
ggplot2::ggplot(data.frame(x)) +
  ggplot2::geom_density(ggplot2::aes(x), color="black", fill="black") +
  ggplot2::stat_function(geom = "line", fun = plot_mix_comps,
    args = list(mixmdl$mu[1], mixmdl$sigma[1], lam = mixmdl$lambda[1]),
    colour = "red") +
  ggplot2::stat_function(geom = "line", fun = plot_mix_comps,
    args = list(mixmdl$mu[2], mixmdl$sigma[2], lam = mixmdl$lambda[2]),
    colour = "blue")

## End(Not run)
```

plot_mix_comps_normal *Custom Function for Overlaying Mixture Components for Normal Distributions*

Description

Plots a mixture component conditioned on a superimposed function

Usage

```
plot_mix_comps_normal(x, mu, sigma, lam)
```

Arguments

x	Input data
mu	Mean of component
sigma	Variance of component
lam	Mixture weight of component

Details

Allows for specifying a custom function to be superimposed when plotting a mixture component assuming a normal distribution. This is the original function for the package, which is also included in the updated `plot_mix_comps()` function.

Examples

```
## Not run:
if(require(mixtools)){
  mixmdl <- mixtools::normalmixEM(faithful$waiting, k = 2)
}
x <- mixmdl$x
x <- data.frame(x)
ggplot2::ggplot(data.frame(x)) +
  ggplot2::geom_density(ggplot2::aes(x), color="black", fill="black") +
  ggplot2::stat_function(geom = "line", fun = plot_mix_comps_normal,
    args = list(mixmdl$mu[1], mixmdl$sigma[1], lam = mixmdl$lambda[1]),
    colour = "red") +
  ggplot2::stat_function(geom = "line", fun = plot_mix_comps_normal,
    args = list(mixmdl$mu[2], mixmdl$sigma[2], lam = mixmdl$lambda[2]),
    colour = "blue")

## End(Not run)
```

plot_mm

Tidy Visualization of Mixture Models

Description

Generates a ggplot of data densities with overlaid mixture components from fit mixture models.

Usage

```
plot_mm(m, k = NULL, data = NULL)
```

Arguments

m	A mixture model object
k	Optional. The number of components specified in the mixture model, m
data	Name of data object required only for EMCluster objects

Details

This is the core function in the package, returning a ggplot object for a fit mixture model. The plot includes the data density with overlaid mixture components.

References

Wickham, H., 2016. ggplot2: elegant graphics for data analysis. Springer.

Examples

```
## Not run:
if(require(mixtools)){
  mixmdl1 <- mixtools::normalmixEM(faithful$waiting, k = 2)
}
plot_mm(mixmdl1, 2)

if(require(mixtools)){
  x <- c(rgamma(200, shape = 50, scale = 11), rgamma(200, shape = 28, scale = 6))
  mixmdl2 <- mixtools::gammamixEM(x, lambda = c(1, 1)/2)
}
plot_mm(mixmdl2)

## End(Not run)
```

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